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Applicant: Foster Wheeler Energia Oy

Dear Sirs,

Referring to the Written Opinion dated 27.07.2005, we hereby submit a written reply, accompanied by new claims 1-12, where claim 1 is amended.

Claim amendment

Claim 1 is amended by introducing therein the features

- "A grid nozzle of a fluidized bed gasifier or combustor"
- "a horizontally extending nozzle channel", and
- "for minimizing cooling of the outer surface of the nozzle piece due to fluidizing gas blown through the nozzle into the fluidized bed reactor".

The present claim 1 is limited to a nozzle of a fluidized bed gasifier or combustor. These reactors are used at a high temperature and the wearing mechanism minimized by the present invention may exist. The amendment is based on line 9 of page 1.

That the nozzle channel (8,10) of the invention is horizontally extending is shown in Figs. 2-5, and also supported by the description.

The last sentence of claim 1, indicating the purpose of the invention, is based, for example, on lines 7-9 of page 6.

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The present invention

The present inventors have noticed that wearing of grid nozzles of a fluidized bed gasifier or combustor, having a horizontal mouth piece, is especially severe when fluidizing gas flowing in a horizontally extending nozzle channel cools the outer surface of the nozzle to a temperature where corrosion accelerating compounds may condense on the surface. The present invention provides means for preventing wearing of the nozzles by arranging a protecting cover outside the lid of the nozzle channel, so as to minimize the cooling of the outer surface.

In conventional vertical grid nozzles, being without a horizontally extending nozzle channel, the cooling of the top surface due to the flowing gas is relatively small, and there is no need to arrange means for preventing the cooling of the outer surface.

Cited documents

D1 shows a nozzle for mixing liquid or gaseous fuel with combustion gas and injecting the mixture into a fluidized bed. The nozzle comprises a heat shield (16) to prevent ignition of the mixture inside the nozzle, due to the flame outside. D1 does not present a horizontally extending nozzle channel or any indications of problems related to cooling of the outer surface of the nozzle due to gas flowing through the nozzle. Thus, the problem and solution of D1 differ clearly from those of the present invention, and, therefore, D1 is not relevant to the novelty or inventive step of the present invention.

D2 discloses a vertical air supply nozzle, which has concrete dome (15) arranged on top of a lid (13) closing the upper end of the nozzle. The concrete dome (15) is to protect the upper end of the dome from wearing. The nozzle of D2 does not have a horizontally extending nozzle channel, and there is no indication of problems due to harmful cooling of the upper surface of the nozzle. Thus the problem and solution of D2 differ clearly from those of the present invention, and, therefore, D2 is not relevant to the novelty or inventive step of the present invention.

D3 shows a nozzle for bringing hot air to a fluidized bed of material to be heated. The nozzle has a double-walled construction in order to prevent the hot air from heating the nozzle so as to damage the material in contact with the nozzle. The problems of the present invention –

excessive erosion and corrosion of a nozzle – are clearly related to the process conditions, and a skilled person would not look for D3, which relates to totally different process conditions, in order to solve the problems. Thus, D3 does not remove the novelty or inventive step of the present invention.

Summary

We believe that the present claims remove the objections of the Written Opinion. Thus we hope that the International Preliminary Examination Report will state that the invention is novel and involves an inventive step.

Yours faithfully,

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Amended claims 1 – 12

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Claims:

1. A grid nozzle of a fluidized bed gasifier or combustor, being formed of a nozzle piece attached to a nozzle tube or forming one entity with said nozzle tube, which
5 nozzle piece comprises a nozzle chamber (6) and a horizontally extending nozzle channel (8, 10) ending to a blow opening of said nozzle, said nozzle chamber and nozzle channel being limited from above by a lid (12), **characterized** in that a protecting cover (22, 32) is attached outside the lid (12) for minimizing cooling of the
10 outer surface of the nozzle piece due to fluidizing gas blown through the nozzle into the fluidized bed gasifier or combustor.
2. Grid nozzle in accordance with claim 1, **characterized** in that said protecting cover (22, 32) is attached spaced apart from the lid (12).
- 15 3. Grid nozzle in accordance with one of the preceding claims, **characterized** in that said protecting cover (22, 32) comprises a cover plate (24, 34) and ribs (26, 26', 36) arranged at least to the periphery thereof.
4. Grid nozzle in accordance with one of the preceding claims, **characterized** in that
20 said protecting cover (22, 32) is attached to the lid (12) by means of ribs (26, 26', 36) at least at the periphery of the protecting cover (22, 32).
5. Grid nozzle in accordance with one of the preceding claims, **characterized** in that heat insulation is arranged between the lid (12) and the protecting cover (22,
25 32).
6. Grid nozzle in accordance with one of the preceding claims, **characterized** in that the protecting cover (22, 32) is attached to the lid (12) at all sides but the one on the blow opening side of the nozzle.
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7. Grid nozzle in accordance with claim 3 or 4, **characterized** in that the protecting cover (22, 32) is attached to the lid (12) by ribs (26') extending to the side surfaces of said lid.

8. Grid nozzle in accordance with one of the preceding claims, **characterized** in that means are arranged at the blow opening end of the nozzle channel (8) for forming a rising gas flow to the front of the blow opening.

5 9. Grid nozzle in accordance with one of the preceding claims, **characterized** in that a smooth bump (30) located on the upper surface of the nozzle channel (8) and extending substantially throughout the whole width thereof has been arranged at the blow opening end of the nozzle channel (8) for forming a rising gas flow in the front of the blow opening.

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10. Grid nozzle in accordance with one of the preceding claims, **characterized** in that the protecting cover (22, 32) is of the same material with the lid (12).

11. Grid nozzle in accordance with one of the preceding claims, **characterized** in
15 that the protecting cover (22, 32) is attached by welding to the lid (12) or to the sides of the lid.

12. Grid nozzle in accordance with one of the preceding claims, **characterized** in
that the protecting cover (22,32) is ceramic.

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